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			ART UNIT	PAPER NUMBER
			1745	
DATE MAILED: 10/19/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/091,821

Applicant(s)

BECKMANN ET AL.

Examiner

Susy N Tsang-Foster

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) 2-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 21-54 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 20020613, 20021009.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1, and 21-54 in the reply filed on 7/29/2004 is acknowledged.
2. Claims 2-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 7/29/2004.

Information Disclosure Statement

3. The information disclosure statements filed on 6/13/2002 and 10/9/2002 have been considered by the Examiner.

Drawings

4. The drawings were received on 10/9/2002. These drawings are disapproved by the Examiner because original Figure 3 has been divided into 2 figures and the labels "First portion with catalyst", "Second portion without catalyst", and "Fluted permeable membrane" have been deleted from original Figure 3 in newly amended Figures 3a and 3b. Removal of these labels from original Figure 3 constitutes new matter in Figures 3a and 3b. Furthermore, it is inappropriate to have the label Figure 3b in Figure 3a. Figures 5A and 5B are also disapproved for the same reasons.

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5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Reference characters 12, 15, 16, 17, 18, 25, 31, 44, 45, 46, 47, 48, 53, 56, 64, 68, 74, 84, 85, 87, 104, 105, 107. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

6. Claim 45 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

In claim 45, the limitation "wherein said system functions in a water generating mode and is coupled to another fuel cell to deliver water to the anode of the fuel cell" does not further limit the structure of the direct oxidation fuel cell and water generating system.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 21-45, and 48-54 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 21, the limitations in step D combined with the limitations of step (F) is not in the original disclosure. Applicant appeared to have mixed up the embodiment shown in Figure 6 which shows a detachable load of a fuel cell water generator with the embodiments of either Figures 7 and 8 which both show a fuel cell system each having a water generator and both do not have a detachable load. The embodiment shown in Figure 6 is drawn to an embodiment of the water generator which is also a direct oxidation fuel cell. The embodiment of Figure 6 does not include a water generator because it is the water generator itself.

In claim 21, the limitation “a water generating assembly in communicating relationship with said fuel source, said source of oxygen, and said fuel cell” is not in the original disclosure.

In claim 21, the limitation “a controller in communicating relationship with said water generating assembly and said fuel cell that controls the introduction of fuel, oxygen and water selectively into said water generating assembly to generate water” is not in the original disclosure. Instead, page 9, lines 25-28 of the present specification states “[s]aid surface 231 may be disposed within a housing (not shown), which may, but need not, have valves or other components (not shown) that control the introduction of fuel and air, as well as the distribution of catalytically generated water and carbon dioxide.” The original disclosure does not support controlling water selectively into the water generating assembly to generate water. Furthermore, it unclear why water would be introduced into the water generating assembly to generate water.

In claim 22, the limitation “a control system for controlling the amount and introduction of fuel and oxygen to said water generating assembly and to said fuel cell” is not in the original disclosure because the specification on page 9, lines 25-28 states that other components not shown control the introduction of fuel and air to the water generator and not to the fuel cell.

In claim 23, the limitation “wherein said control system includes one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is not in the original disclosure. Instead, page 9, lines 17-18 of the present specification states “[o]peration of the water generator 23 is controlled by the operation of valve 20, which manages the flow of fuel or fuel solution into the water generator.” The original disclosure does not support a valve assembly or means for controlling the opening and closing of one or more valves in the valve assembly. Furthermore, it appears that the

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limitation “means for controlling the opening and closing of one or more valves in the valve assembly” is indefinite because there is no corresponding structure described in the specification for the means plus function language and it is therefore unclear what the means is in this limitation.

In claim 26, the limitation “wherein said water may be delivered to said anode chamber by the operation of one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is not in the original disclosure.

In claim 27, the limitation “further comprising said water generating assembly being coupled to said cathode chamber of said direct oxidation fuel cell in such a manner that oxygen may be selectively introduced into said cathode chamber, and when combined with fuel in the presence of the cathode aspect of the catalyzed membrane, produces water” is not in the original disclosure. Applicant appears to be mixing the embodiment of Figure 7 which is a direct oxidation fuel cell system with the embodiment of Figure 6 in this limitation.

In claim 28, the limitation “said water may be delivered to said cathode chamber by the operation of one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is not supported by the original disclosure.

In claim 31, the limitation “further comprising at least one of the following: a first fluid flow controller for controlling the introduction of fuel through said first conduit to said water generating assembly, and a second fluid flow controller for controlling the fluid flow through said second conduit from said water generating assembly to said direct oxidation fuel cell” is not in the original disclosure.

In claim 32, the limitation “wherein said at least one of said first and second fluid flow controllers includes at least one of the following: a valve, and a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is not in the original disclosure.

In claim 34, the limitation “further comprising at least one fluid flow controller for controlling the introduction of fluids into or through one of said first, second and third conduits” is not in the original disclosure.

In claim 35, the limitation “wherein said fluid flow controller includes one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is not in the original disclosure.

In claim 36, the limitation “but carbon dioxide is trapped and is thus directed out through associated outlet ports in said fuel cell, while generated water remains in said anode chamber, or can be directed as desired in said fuel cell system” is not in the original disclosure.

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Instead, the specification on page 9, lines 25-28 states “[s]aid surface 231 may be disposed within a housing (not shown), which may, but need not, have valves or other components (not shown) that control the introduction of fuel and air, as well as the distribution of catalytically generated water and carbon dioxide.” The specification does not support that the generated water remains in the anode chamber. Instead, the water generated in the water generating assembly can be controlled by other components (which would be a controller) to distribute the catalytically generated water and carbon dioxide.

In claim 38, the limitation “a controller for adjusting the introduction of fuel from said fuel source into said housing and for adjusting the introduction of oxygen from said oxygen source into said housing to determine whether said system function to generate electricity or to generate water” is not in the original disclosure. Instead, page 12 of the specification states that in a first operation mode where no electricity is generated, air and fuel or fuel solution are introduced into the anode compartment 66 via openings 69 and 70 respectively and that in the second operation, oxygen is prevented from entering the anode chamber 66 and water is generated on the catalyzed cathode aspect of the PCM.

In claim 40, the limitation “further comprising: an adjustable oxygen port in said housing that can be closed to prevent oxygen from entering said housing” is not in the original disclosure. Instead, the drawings (see Figure 6) support an adjustable oxygen port is said housing that can be closed to prevent oxygen from entering the anode chamber.

In claim 44, the limitation “further comprising means for periodically varying the load attached to the system in order to periodically induce fuel crossover, resulting in the generation of water” is not in the original disclosure. Instead, page 12, line 31 to page 13, line 3 of the

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present specification state “[i]t may be further possible to intentionally vary said load attached to water generator/DMFC 61 periodically in order to periodically induce fuel crossover, and resulting generation of water.” The original disclosure does not support any means for periodically varying the load and it is unclear what this means is.

In claim 48, limitation “disposing a water generating assembly including a catalyst in said direct oxidation fuel cell system between said source of fuel and said fuel cell, and providing a control system that controls the amount and introduction of fuel, and oxygen to said water generating assembly and said fuel cell” is not in the original disclosure since claim 1 already recites reacting a fuel and oxygen to produce water and the original disclosure does not disclose a second water generator in a fuel cell system.

In claim 51, the limitation “determining whether said system functions to generate electricity or to generate water” is not in the original disclosure.

In claim 51, the limitation “controlling the introduction of fuel and oxygen into said housing as needed to cause said system to function to either generate electricity or to generate water” is not in the original disclosure. Instead, page 12 of the specification states that in a first operation mode where no electricity is generated, air and fuel or fuel solution are introduced into the anode compartment 66 via openings 69 and 70 respectively and that in the second operation, oxygen is prevented from entering the anode chamber 66 and water is generated on the catalyzed cathode aspect of the PCM.

Claims depending from claims rejected under 35 USC 112, first paragraph are also rejected for the same.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 21-45, and 48-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 21, the limitation "a water generating assembly in communicating relationship with said fuel source, said source of oxygen, and said fuel cell" is indefinite because it is unclear what a communicating relationship is.

In claim 21, the limitation "a controller in communicating relationship with said water generating assembly" is indefinite because it is unclear what a communicating relationship is.

In claim 23, the limitation "wherein said control system includes one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly" is indefinite because there is no corresponding structure described in the specification for the means plus function language and it is therefore unclear what the means is in this limitation. Furthermore, the limitation "one or more valves in the valve assembly" lacks antecedent basis within the claim.

In claim 26, the limitation “wherein said water may be delivered to said anode chamber by the operation of one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is indefinite because there is no corresponding structure described in the specification for the means plus function language and it is therefore unclear what the means is in this limitation. Furthermore, the limitation “one or more valves in the valve assembly” lacks antecedent basis within the claim.

Claim 27 is indefinite because it is unclear why the cathode chamber of the fuel cell would be producing water when the water generating assembly is used to produce water.

In claim 28, the limitation “said water may be delivered to said cathode chamber by the operation of one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is indefinite because there is no corresponding structure described in the specification for the means plus function language and it is therefore unclear what the means is in this limitation. Furthermore, the limitation “one or more valves in the valve assembly” lacks antecedent basis within the claim. Also, it is unclear why the water may be delivered to the cathode chamber when claim 27 recites that water is produced in the cathode chamber when oxygen is selectively introduced into the cathode chamber and combined with fuel in the presence of the cathode aspect of the catalyzed membrane.

In claim 32, the limitation “wherein said at least one of said first and second fluid flow controllers includes at least one of the following: a valve, and a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is indefinite because there is no corresponding structure described in the specification for the means plus function language and it is therefore unclear what the means is in this limitation. Furthermore, the limitation “one or more valves in the valve assembly” lacks antecedent basis within the claim.

In claim 35, the limitation “wherein said fluid flow controller includes one of the following: a valve, or a valve assembly that includes means for controlling the opening and closing of one or more valves in the valve assembly” is indefinite because there is no corresponding structure described in the specification for the means plus function language and it is therefore unclear what the means is in this limitation. Furthermore, the limitation “one or more valves in the valve assembly” lacks antecedent basis within the claim.

In claim 36, the limitation “but carbon dioxide is trapped and is thus directed out through associated outlet ports in said fuel cell, while generated water remains in said anode chamber, or can be directed as desired in said fuel cell system” is indefinite because it is unclear how the water is directed as desired in the fuel cell system.

In claim 38, the limitation “a source of oxygen in fluid communication with said housing” is indefinite because it is unclear which part of the housing the source of oxygen is in fluid communication.

In claim 44, the limitation “further comprising means for periodically varying the load attached to the system in order to periodically induce fuel crossover, resulting in the generation of water” is indefinite because there is no corresponding structure described in the specification for the means plus function language and it is therefore unclear what the means is in this limitation.

In claim 45, the limitation “wherein said system functions in a water generating mode and is coupled to another fuel cell to deliver water to the anode of the fuel cell” is indefinite because it is unclear which fuel cell that water is being delivered to.

In claim 48, limitation “disposing a water generating assembly including a catalyst in said direct oxidation fuel cell system between said source of fuel and said fuel cell, and providing a control system that controls the amount and introduction of fuel, and oxygen to said water generating assembly and said fuel cell” is indefinite because it is unclear how the water generating assembly including a catalyst differs from the catalyst recited in claim 1.

Claim 48 recites the limitation "said direct oxidation fuel cell system" in lines 3 and 4. There is insufficient antecedent basis for this limitation in the claim.

In claim 51, the limitation “controlling the introduction of fuel and oxygen into said housing as needed to cause said system to function to either generate electricity or to generate water” is indefinite because it is unclear what as needed means.

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Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 1 and 46-50 are rejected under 35 U.S.C. 102(b) as being anticipated by Surampudi et al. (US Pat. No. 5,773,162) and as evidenced by Banerjee (US Pat. No. 5,795,668).

Surampudi et al. disclose a direct methanol fuel cell system (see Figure 9) comprising a pure methanol tank 900 that stores pure methanol and a water tank 908 which provides a supply of water necessary to control the concentration of the methanol delivered to the fuel cell stack (col. 17, lines 5-27). The water used in the methanol solution can be recycled from the cathode in order to avoid the need to carry large amounts of water (col. 16, lines 50-55). The liquid methanol which is dissolved in water permeates through the solid polymer electrolyte membrane and combines with the oxygen on the surface of the cathode electrocatalyst (col. 5, lines 20-25). This reaction inherently generates water as evidenced by Banerjee (US Patent No. 5,795,668) which shows in the Figure of the patent that methanol crossover occurs in a direct methanol fuel

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cell and the diffused methanol reacts with oxygen on the cathode catalyst to generate water and carbon dioxide and heat. Thus water recycled from the cathode used to control the concentration of methanol is generated by the methanol fuel and oxygen reacted on the cathode catalyst.

13. Claims 1, 21-35, 37-40, and 45-51 are rejected under 35 U.S.C. 102(e) as being anticipated by Acker et al. (US PG PUB 2002/0122966 A1).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Acker et al. disclose a fuel cell system comprising a detachable load 105, oxidant in fluid communication with the cathode chamber, carbonaceous fuel in fluid communication with anode chamber (see Figure 2) and increasing the concentration of methanol fuel in the anode to accelerate crossover of fuel through the membrane electrolyte (paragraph 10) which inherently generates water which is collected and used to dilute the methanol solution (see Figure 2). Furthermore, Figure 6 shows a conduit assembly used to generate heat and comprises a catalyst/supporting material that is exposed to the interior of the conduit assembly such that when neat methanol or aqueous methanol solution passes over it heat-producing oxidation takes place and air to support the oxidation is made available by the membrane 601 that is permeable to gas but impermeable to neat methanol, water, or aqueous methanol solution. This conduit assembly inherently generates water which dilutes the methanol fuel that is fed into the anode

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when implemented as conduit 205 in Figure 2 (see paragraph 31). In order to control the amount of heat generated by the conduit assembly 600, an arrangement for controlling the flow of methanol through the conduit is provided by valves or alternatively the flow of air could be regulated to control the rate of oxidation which inherently generates water (see paragraph 32).

14. Claims 1, 21-35, 37-40, and 45-51 are rejected under 35 U.S.C. 102(e) as being anticipated by Colbow et al. (US 2003/0003336 A1).

Colbow et al. disclose a fuel cell system comprising a fuel cell 2 and gas/liquid separator 3 that separates unreacted or by-product liquid water and methanol from the air and fuel outlet streams and the liquid water and methanol mixture is directed from liquid outlet 3a and circulated back into the fuel inlet stream which dilutes the fuel inlet stream (see paragraph 45). The fuel cell is operated in the open circuit state (without a load) while methanol solution is supplied to the fuel inlet stream such that the temperature of the stack increases as a result of methanol crossover and combustion which inherently generates water that is fed into gas/liquid separator 3.

Conclusion

Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ *Susy Tsang-Foster*

Susy Tsang-Foster
Primary Examiner
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